Greg Gibson
Vice President, Regulatory Affairs

750 East Pratt Street, Suite 1600
Baltimore, Maryland 21202

UniStar
NUCLEAR ENERGY

10 CFR 50.4
10 CFR 52.79

July 29, 2009

UN#09-329

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: UniStar Nuclear Energy, NRC Docket No. 52-016
Response to Request for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3,
RAI No. 58, Seismic Design Parameters, and
RAI No. 65, Seismic System Analysis

References:
1) John Rycyna (NRC) to Robert Poche (UniStar Nuclear Energy), "RAI No. 58 SEB2 1966.doc (PUBLIC)" email dated February 17, 2009

2) John Rycyna (NRC) to Robert Poche (UniStar Nuclear Energy), "RAI No. 65 SEB2 1971.doc (PUBLIC)" email dated February 18, 2009

3) UniStar Nuclear Energy Letter UN#09-320, from Greg Gibson to Document Control Desk, U.S. NRC, Response to Request for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3, RAI No. 58, Seismic Design Parameters, RAI No. 63, Seismic Subsystem Analysis, and RAI No. 65, Seismic System Analysis, dated July 15, 2009

The purpose of this letter is to respond to the requests for additional information (RAIs) identified in the NRC e-mail correspondence to UniStar Nuclear Energy, dated

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February 17, 2009 (Reference 1), and February 18, 2009 (Reference 2). These RAIs address Seismic Design and Analysis, as discussed in Section 3.7 of the Final Safety Analysis Report (FSAR), as submitted in Part 2 of the CCNPP Unit 3 Combined License Application (COLA), Revision 5.

Enclosure 1 provides the schedule for responses to the RAIs specified in References 1 and 2 based on Reference 3. Reference 3 stated that a partial response to RAI No. 58, Question 03.07.01-3 and RAI No. 65, Question 03.07.02-18 would be provided by July 29, 2009, which are attached (Enclosure 2).

The response to RAI No. 65 Question 03.07.02-18 includes revised COLA content. A Licensing Basis Document Change Request has been initiated to incorporate these changes into a future revision of the COLA.

Our responses to RAI No. 58, Question 03.07.01-3 and RAI No. 65, Question 03.07.02-18 do not include any new regulatory commitments.

If there are any questions regarding this transmittal, please contact me at (410) 470-4205, or Mr. Michael J. Yox at (410) 495-2436.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on July 29, 2009

Greg Gibson

Enclosures:
1) Response Summary for Requests for Additional Information, RAI No. 58, Seismic Design Parameters; and RAI No. 65, Seismic System Analysis; Calvert Cliffs Nuclear Power Plant Unit 3

2) Response to NRC Request for Additional Information, RAI No. 58, Seismic Design Parameters, Question 03.07.01-3 and RAI No. 65, Seismic System Analysis, Question 03.07.02-18; Calvert Cliffs Nuclear Power Plant, Unit 3

cc: John Rycyna, NRC Project Manager, U.S. EPR COL Application
Laura Quinn, NRC Environmental Project Manager, U.S. EPR COL Application
Getachew Tesfaye, NRC Project Manager, U.S. EPR DC Application (w/o enclosure)
Loren Plisco, Deputy Regional Administrator, NRC Region II (w/o enclosure)
Silas Kennedy, U.S. NRC Resident Inspector, CCNPP, Units 1 and 2
U.S. NRC Region I Office

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Enclosure 1

Response Summary for Requests for Additional Information, RAI No. 58, Seismic Design Parameters, and RAI No. 65, Seismic System Analysis; Calvert Cliffs Nuclear Power Plant Unit 3

Response Summary for Requests for Additional Information

RAI Set 58 Question	Description of RAI Item	Response Date
03.07.01-1	Justify assumptions of rigid basemat in SSI analysis of Nuclear Island including lower bound soil properties (where shear wave velocity is less than 1000 fps)	September 15, 2009
	Identify impact on the SSI analysis results and on the design of the foundation mat and supported superstructure.	September 15, 2009
03.07.01-2	See UniStar Nuclear Energy letter UN#09-320, dated July 29, 2009	Response submitted
03.07.01-3	For EPGB and ESWB, provide methodology to calculate FIRS at grade elevation computed from the GMRS which were determined at an applicable elevation 41 ft below grade.	August 29, 2009
	Describe computer codes, soil column model, and the basis for the shear wave velocity of the structural backfill that supports both the EPGB and ESWB and the impact of this backfill on the development of the FIRS.	December 29, 2009
	Provide in the FSAR the spectra at the foundation level of each structure meeting Appendix S requirements.	December 29, 2009
	Provide in the FSAR a comparison of the FIRS at the foundation level of each structure meeting the requirements of Appendix S to the CSDRS provided in the U.S. EPR FSAR.	December 29, 2009
	Provide the basis for not performing confirmatory analysis for the EPGB and ESWB similar to that for NI.	This Letter – See Enclosure 2.
03.07.01-4	See UniStar Nuclear Energy letter UN#09-320, dated July 29, 2009	Response submitted
03.07.01-5	For Ultimate Heat Sink Electrical Building, provide and include in the RAI response FSAR the horizontal and vertical spectra depicting design spectra and applicable envelope.	August 29, 2009
	Provide in the FSAR a reconciliation of the design response spectrum with the horizontal foundation input response spectra (FIRS) for this structure which meets the minimum requirements of 10 CFR Part 50,	December 29, 2009

Response Summary for Requests for Additional Information

RAI Set 58 Question	Description of RAI Item	Response Date
	Appendix S.	
	Include a description of how the FIRS are developed including the soil model, soil properties, backfill properties, computer programs and analysis assumptions.	December 29, 2009
03.07.01-6	Provide in the FSAR how the design response spectrum and assumed soil properties used in the analysis of the UHS MWIS will be reconciled with the FIRS that meets the requirements of Appendix S and the final soil properties determined from the site final geotechnical studies.	September 14, 2009
	Include in the FSAR a comparison of the FIRS with the design response spectra used in the analysis.	December 29, 2009
	Include a description of how the FIRS are developed including the soil model, soil properties, computer programs, and analysis assumptions.	December 29, 2009
03.07.01-7	Provide in the FSAR a discussion of the site-specific spectra that were considered for buried utilities.	December 29, 2009
	Provide justification for the use of the EUR soft soil spectrum including possible displacement and velocity differences that may exist with the use of this spectrum as opposed to using a site specific spectrum.	December 29, 2009
	Provide a comparison of the EUR soft soil spectrum with appropriate site specific spectra that are applicable to buried utilities.	December 29, 2009
03.07.01-8	See UniStar Nuclear Energy letter UN#09-228, dated May 1, 2009	Response submitted
03.07.01-9	See UniStar Nuclear Energy letter UN#09-291, dated June 12, 2009.	Response submitted
03.07.01-10	State explicitly or by reference design ground motion time histories for RAI partial Nuclear Island, EPGB and ESWB structures.	September 15, 2009
	What are the site specific design ground motions and their bases that apply to these structures? Provide this information in Section 3.7.1.1.2 of the FSAR.	December 29, 2009

Response Summary for Requests for Additional Information

RAI Set 65 Question	Description of RAI Item	Response Date
03.07.02-1	See UniStar Nuclear Energy letter UN#09-228, dated May 1, 2009	Response submitted
03.07.02-2	See UniStar Nuclear Energy letter UN#09-291, dated June 12, 2009.	Response submitted
03.07.02-3	See UniStar Nuclear Energy letter UN#09-291, dated June 12, 2009.	Response submitted
03.07.02-4	Provide results of SSI analysis for Ultimate Heat Sink Electrical Building that meet the acceptance criteria 4.A.vii of SRP 3.7.1 and acceptance criteria 4 of SRP 3.7.2 using subgrade model of final soil and backfill properties or justify alternative.	December 29, 2009
	Include SSSI effects from UHS MWIS.	December 29, 2009
	Reconcile with the results of assumed seismic response and ISRS.	December 29, 2009
03.07.02-5	See UniStar Nuclear Energy letter UN#09-291, dated June 12, 2009.	Response submitted
03.07.02-6	Describe how the SSI analysis performed for Ultimate Heat Sink Makeup Water Intake Structure (UHS MWIS) meets the acceptance criteria and 4.A.vii of SRP 3.7.1 or justify alternative.	December 29, 2009
	Provide a figure depicting the soil-structure model used for the seismic analysis.	December 29, 2009
	Provide the basis for the assumed soil properties and profile used to calculate the frequency independent impedance functions.	August 15, 2009
	Provide the method and formulas used to calculate the values of the soil springs under the foundation as well as the lateral soil springs that represent the embedment effects.	August 15, 2009

Response Summary for Requests for Additional Information

RAI Set 65 Question	Description of RAI Item	Response Date
	State whether the soil properties used in the analysis are strain dependent or simply the low strain values. If these are low strain values, justify their use and quantify the impact of not using strain dependent properties on the results of the analysis. If the soil properties are strain dependent, describe how the final soil properties are determined in the analysis.	August 15, 2009
	For large values of Poisson's ratio, the dynamic stiffness and damping are frequency dependent. Provide justification for assuming that the impedance functions of the supporting foundation are frequency independent.	August 15, 2009
	Confirm that the control motion is applied at the base of the soil structure analysis model.	August 15, 2009
	Provide a reconciliation of the final soil properties and the foundation input response spectra (FIRS) that are based on these properties with the seismic analysis results described in the FSAR.	December 29, 2009
03.07.02-7	See UniStar Nuclear Energy letter UN#09-291, dated June 12, 2009.	Response submitted
03.07.02-8	See UniStar Nuclear Energy letter UN#09-291, dated June 12, 2009.	Response submitted
03.07.02-9	See UniStar Nuclear Energy letter UN#09-126, dated March 19, 2009	Response submitted
03.07.02-10	See UniStar Nuclear Energy letter UN#09-228, dated May 1, 2009	Response submitted
03.07.02-11	See UniStar Nuclear Energy letter UN#09-291, dated June 12, 2009.	Response submitted
03.07.02-12	Provide results of a structure-to-structure interaction analysis between UHS MWIS and EB.	December 29, 2009
03.07.02-13	See UniStar Nuclear Energy letter UN#09-291, dated June 12, 2009.	Response submitted
03.07.02-14	See UniStar Nuclear Energy letter UN#09-228, dated May 1, 2009	Response submitted

Response Summary for Requests for Additional Information

RAI Set 65 Question	Description of RAI Item	Response Date
03.07.02-15	See UniStar Nuclear Energy letter UN#09-320, dated July 29, 2009	Response submitted
03.07.02-16	See UniStar Nuclear Energy letter UN#09-126, dated March 19, 2009	Response submitted
03.07.02-17	The interaction of non-seismic Category I structures with Seismic Category I systems is described in FSAR Section 3.7.2.8. In this section on page 3.0-41, it states that fire protection SSCs are categorized as either Seismic Category II-SSE, meaning the SSC must remain functional during and after a Safe Shutdown Earthquake (SSE), or Seismic Category II, meaning the SSC must remain intact after an SSE without deleterious interaction with a Seismic Category I or Seismic Category II-SSE SSC. In the U.S. EPR FSAR on page 3.7-95, it states that Seismic Category II is designed to the same criteria as Seismic Category I structures. In SRP 3.7.2, SRP Acceptance Criteria 8, which addresses the interaction of non-Category I structures with Category I SSCs, it states that when non-Category I structures are designed to prevent failure under SSE conditions; the margin of safety shall be equivalent to that of the Seismic Category I structure. • Describe how this margin of safety is achieved for the Seismic Category II-SSE and Seismic Category II portions of the fire protection system. Include in your response the seismic inputs, loading combinations, codes and acceptance criteria. What are the differences in the method of design for these two seismic categories? • Describe the basis and provide figures in the FSAR of the design response spectra used to analyze above ground seismic Category II and seismic Category II-SSE fire protection SSCs including the fire protection tanks. • What are the methods of analysis and acceptance criteria for both the buried and above ground portions of the fire protection system that are Seismic Category II-SSE that will ensure that these portions of the system will remain functional following an SSE event? • What are the modeling and analysis methods used for the fire protection tanks and to what extent do the fire protection tanks meet the acceptance criteria of SRP 3.7.3, SRP Acceptance Criteria 14.A. thru J? When the tank analysis does not meet the acceptance criteria, provide the technical justification for not doing so.	October 16, 2009

Response Summary for Requests for Additional Information

RAI Set 65 Question	Description of RAI Item	Response Date
03.07.02-18	Clarify the seismic classification of fire protection tank and building.	This Letter – See Enclosure 2.
	Reconcile the U.S. EPR seismic analysis for NAB with the site-specific soil properties and foundation input response spectra (FIRS)	September 15, 2009
	Demonstrate in the FSAR that the displacement of this structure relative to the nuclear island common basemat structure is enveloped by the results of the U.S. EPR analysis.	September 15, 2009
03.07.02-19	In FSAR Section 3.7.2.8 on page 3.0-42 it states that the conventional seismic switchgear building, conventional seismic grids systems control building, the conventional seismic circulating water intake structure and the Seismic Category II retaining wall surrounding the CCNPP Unit 3 intake channel could potentially interact with Seismic Category I SSCs. For each of the above structures, describe in the FSAR how the seismic interaction acceptance criteria of SRP 3.7.2, SRP Acceptance Criteria 8 are met, or justify an alternative. If they are intended to meet criterion B, provide the technical basis for the determination that the collapse of the non-Category I structure is acceptable. For criterion C, confirm that the structure will be analyzed and designed to have a margin of safety equivalent to that of a Category I structure and state how this will be accomplished.	October 16, 2009
03.07.02-20	See UniStar Nuclear Energy letter UN#09-291, dated June 12, 2009.	Response submitted
03.07.02-21	See UniStar Nuclear Energy letter UN#09-228, dated May 1, 2009	Response submitted
03.07.02-22	See UniStar Nuclear Energy letter UN#09-126, dated March 19, 2009	Response submitted
03.07.02-23	See UniStar Nuclear Energy letter UN#09-291, dated June 12, 2009.	Response submitted
03.07.02-24	Per COLA item 3.7-1, address that the seismic response of the nuclear island common base mat structures, seismic Category II structures, the Nuclear Auxiliary Building and the Radioactive Waste Processing Building is within the parameters of Section 3.7 of U.S. EPR FSAR.	September 15, 2009

Response Summary for Requests for Additional Information

RAI Set 65 Question	Description of RAI Item	Response Date
	Provide a summary for each structure, either directly or by reference, which describes how the COL item is met.	September 15, 2009
03.07.02-25	See UniStar Nuclear Energy letter UN#09-228, dated May 1, 2009	Response submitted
03.07.02-26	See UniStar Nuclear Energy letter UN#09-291, dated June 12, 2009.	Response submitted

Enclosure 2

**Response to NRC Request for Additional Information,
RAI No. 58, Seismic Design Parameters, Question 03.07.01-3; and
RAI No. 65, Seismic System Analysis; Question 03.07.02-18;
Calvert Cliffs Nuclear Power Plant Unit 3**

RAI No. 58

Question 03.07.01-3

FSAR Section 3.7.1.1.1 (Design Ground Motion Response Spectra) starting on page 3.0-31, describes the seismic reconciliation of the certified seismic design response spectra (CSDRS) and ground motion response spectra (GMRS) for the Emergency Power Generating Buildings (EPGBs) and Essential Service Water Buildings (ESWBs). A comparison is made in Figures 3.7-35 and 3.7-36 between the three European Utility Requirements (EUR) spectra that define the horizontal and vertical CSDRS for the U.S. EPR with the horizontal and vertical site specific foundation input response spectra (FIRS) defined at grade.

- How were the FIRS at grade elevation computed from the GMRS which were determined at an elevation 12.5 m (41 ft) below grade? Include in the response, computer codes, soil column model, and the basis for the shear wave velocity of the structural backfill that supports both the EPGB and ESWB and the impact of this backfill on the development of the FIRS?

- The horizontal FIRS presented in Table 3.7-4 have a peak ground acceleration of 0.0842 g's. Appendix S to 10 CFR Part 50 states that the horizontal component of the SSE ground motion in the free field at the foundation level of a structure must be an appropriate response spectrum with a peak ground acceleration of at least 0.1 g. For both the EPGB and ESWB, provide in the FSAR the Appendix S minimum spectra at the foundation level of each structure meeting Appendix S requirements.

- Provide in the FSAR a comparison of the FIRS at the foundation level of each structure meeting the requirements of Appendix S to the CSDRS provided in the U.S. EPR FSAR.

For the nuclear island (NI) common basemat structures, a confirmatory analysis was performed to demonstrate that the seismic results using the ground motion associated with the FIRS coupled with the site specific soil profile and strain dependent soil properties were bounded by the certified design results. As the soil conditions under the EPGB and ESWB are similar to that under the NI common basemat structures and as these structures are supported on a significant depth of backfill, provide the basis for not providing a similar confirmatory analysis for the EPGB and ESWB.

Response

As shown in Enclosure 1, only a partial response to this RAI question is scheduled at this time. The following response addresses the confirmatory analysis for the Emergency Power Generating Building (EPGB) and Essential Service Water Buildings (ESWB):

As discussed in CCNPP Unit 3 COLA FSAR Section 3.7.1.1.1, the site-specific seismic reconciliation of EPGB and ESWB is based on the guidelines provided in U.S. EPR FSAR Section 2.5.2.6. A confirmatory analysis was not performed.

However, as discussed during the NRC onsite technical audit (March 17 to the 19, 2009) and the April 17, 2009 public meeting, a confirmatory analysis will be completed for EPGB and

ESWB. The confirmatory analysis will be based on the CCNPP Unit 3 site-specific design SSE response spectrum and strain compatible soil properties, and include the effects of structural fill and structure-soil-structure interaction due to the Nuclear Island (NI).

COLA Impact

The results of the site-specific reconciliation will be incorporated in FSAR at the completion of response to RAI 112, Question 03.07.01-11 scheduled for December 29, 2009[1].

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[1] UniStar Nuclear Energy Letter UN#09-291, from Greg Gibson (UniStar Nuclear Energy) to Document Control Desk, U.S. NRC, Response to Request for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3, RAI No. 58, Seismic Design Parameters, RAI No. 63, Seismic Subsystem Analysis, RAI No. 65, Seismic System Analysis, and RAI 112, Seismic Design Parameters, dated June 12, 2009

RAI No. 65

Question 03.07.02-18

In FSAR Section 3.7.2.8 on page 3.0-42, it states the U.S.EPR FSAR Section 3.7.2.8 addresses the interaction of certain Non-Seismic Category I structures with Seismic Category I structures These structures are the Vent Stack, Nuclear Auxiliary Building (NAB), Access Building (AB), Turbine Building (TB), Radioactive Waste Processing Building (RWPB) and the Firewater Storage Tanks and Fire Protection Building.

- The Fire Protection Tanks and Fire Protection Building are classified as Seismic Category II-SSE in the CCNPP Unit 3 FSAR. This is an exception to the U.S. EPR FSAR which classifies them as conventional seismic. Please revise this section of the CCNPP FSAR to identify and clarify this difference.

- A seismic analysis was performed for the NAB in the U.S. EPR FSAR. Since this structure could potentially interact with Seismic Category I structures, the CCNPP FSAR needs to reconcile the U.S. EPR analysis with the site-specific soil properties and foundation input response spectra (FIRS) for the NAB. Also demonstrate in the FSAR that the displacement of this structure relative to the nuclear island common basemat structure is enveloped by the results of the U.S. EPR analysis.

Response

This response addresses the first bulleted item in the question regarding classification of the Fire Protection Tanks and Fire Protection Building.

U.S. EPR FSAR Section 3.7.2.8 includes a discussion of the Fire Protection Storage Tanks and Buildings. It states,

> "The Fire Protection Storage Tanks and Buildings are classified as Conventional Seismic Structures. RG 1.189 requires that a water supply be provided for manual firefighting in areas containing equipment for safe plant shutdown in the event of a SSE. Therefore, the fire protection storage tanks and building are designed to provide system pressure integrity under SSE loading conditions. Seismic load combinations are developed in accordance with the requirements of ASCE 43-05 using a limiting acceptance condition for the structure characterized as essentially elastic behavior with no damage (i.e., Limit State D) as specified in the Standard."

In the same section of the U.S. EPR FSAR it states that the Fire Protection Storage Tanks and Buildings are site-specific and includes a COL applicant item to provide the seismic design basis for the sources of fire protection water supply for safe plant shutdown in the event of a SSE.

The Fire Protection Storage Tanks and Buildings have been designated as Seismic Category II-SSE in the CCNPP Unit 3 COLA FSAR Section 3.7.2.8. This augmented classification was established to identify that the Fire Building Storage Tanks and Buildings satisfy the U.S. EPR FSAR Section 3.7.2.8 requirement of Conventional Seismic. They must also satisfy the U.S. EPR Section 3.7.2.8 requirement to meet RG 1.189 to provide a water

supply for manual firefighting in areas containing equipment for safe plant shutdown in the event of a SSE. This categorization ensures the fire protection storage tanks and building are designed to provide system pressure integrity under SSE loading conditions.

The CCNPP Unit 3 COLA FSAR Section 3.7.2.8 will be updated to clearly indicate the seismic category and design basis of the Fire Protection Storage Tanks and Buildings and resolve any discrepancy with the U.S. EPR FSAR.

In addition, the CCNPP Unit 3 COLA FSAR Section 3.7.2.8 identified the design information (with double brackets "[[ ]]") for the Fire Protection Storage Tanks and Building as conceptual. The CCNPP Unit 3 COLA FSAR Section 3.7.2.8 text will be updated to remove that double bracketed information as the U.S. EPR FSAR Section 3.7.2.8 text is not designated as conceptual.

COLA Impact:

The following changes to FSAR Section 3.7.2.8 will be updated in a future COLA revision.

3.7.2.8 Interaction of Non-Seismic Category I Structures with Seismic Category I Systems

The U.S. EPR FSAR includes the following COL Item and conceptual design information in Section 3.7.2.8:

> A COL applicant that references the U.S. EPR design certification will provide the site-specific separation distances for the Access Building and Turbine Building.
>
> [[The separation gaps between the AB and SBs 3 and 4 are 0.98 ft and 1.31 ft, respectively (see Figure 3B-1).]]
>
> [[The separation between the TB and NI Common Basemat Structures is approximately 30 ft (see Figure 3B-1).]]

The COL Item and the conceptual design information are addressed as follows:

The conceptual design information identified above is incorporated by reference.

The U.S. EPR FSAR includes the following COL Item ~~and conceptual design information~~ in Section 3.7.2.8:

> A COL applicant that references the U.S. EPR design certification will provide the seismic design basis for the sources of fire protection water supply for safe plant shutdown in the event of a SSE.
>
> ~~[[**Fire Protection Storage Tanks and Buildings**]]~~
>
> ~~[[The Fire Protection Storage Tanks and Buildings are classified as Conventional Seismic Structures.]]~~

~~[[The fire protection storage tanks and building are designed to provide system pressure integrity under SSE loading conditions. Seismic load combinations are developed in accordance with the requirements of ASCE 43-05 (ASCE, 2005) using a limiting acceptance condition for the structure characterized as essentially elastic behavior with no damage (i.e., Limit State D) as specified in the Standard.]]~~

The COL Item ~~and conceptual design information are~~ is addressed as follows:

The U.S EPR FSAR Section 3.7.2.8 states that the Fire Protection Storage Tanks and Buildings are classified as Conventional Seismic Structures and that RG 1.189 (NRC, 2007) requires that a water supply be provided for manual firefighting in areas containing equipment for safe plant shutdown in the event of a SSE. The U.S EPR FSAR Section 3.7.2.8 also states the fire protection storage tanks and building are designed to provide system pressure integrity under SSE loading conditions.

In addition to the Seismic Classifications defined in U.S. EPR FSAR Section 3.2.1, a seismic classification of Seismic Category II-SSE is utilized. This designation is utilized to ensure the design basis requirement that Fire Protection SSC are required to remain functional during and following a seismic event to support equipment required to achieve safe shutdown.

Refer to Section 3.2.1 and U.S. EPR FSAR Section 3.2.1 for ~~the definition of~~ further discussion of seismic classifications ~~used in this Section~~. In addition, Section 3.2.1 categorizes Fire Protection SSC into two categories:

1. SSC that must remain functional during and after an SSE (i.e., Seismic Category II-SSE); and

2. SSC that must remain intact after an SSE without deleterious interaction with Seismic Category I or Seismic Category II-SSE (i.e., Seismic Category II).

Fire Protection SSC required to remain functional during and following a safe shutdown earthquake to support safe shutdown of the plant following a design basis seismic event are designated as Seismic ~~Class~~ Category II-SSE. The following Fire Protection structures, systems, and components are required to remain functional during and after a seismic event:

1. Fire Water Storage Tanks;

2. Fire Protection Building;

3. Diesel driven fire pumps and their associated sub systems and components, including the diesel fuel oil system;

4. Critical support systems for the Fire Protection Building, i.e., ventilation; and

5. The portions of the fire water piping system and components (including isolation valves) which supply water to the stand pipes in buildings that house the equipment required for safe shutdown of the plant following an SSE.

Manual actions may be required to isolate the portion of the Fire Protection piping system that is not qualified as Seismic Category II-SSE.

U.S. EPR FSAR Section 3.7.2.8 addresses the interaction of the following Non-Seismic Category I structures with Seismic Category I structures:

- Vent Stack
- Nuclear Auxiliary Building
- Access Building
- Turbine Building
- Radioactive Waste Processing Building
- ~~Fire Water Storage Tanks and Fire Protection Building~~

{The following CCNPP Unit 3 Non-Seismic Category I structures identified in Table 3.2-1 could also potentially interact with Seismic Category I SSC:

- Buried and aboveground Seismic Category II and Seismic Category II-SSE Fire Protection SSC, including Fire Water Storage Tanks and Fire Protection Building ~~other than those addressed in the U.S. EPR FSAR Section 3.7.2.8~~
- Conventional Seismic Switchgear Building
- Conventional Seismic Grid Systems Control Building.
- Seismic Category II Forebay structure.
- Conventional Seismic Circulating Water Intake Structure.
- Conventional Seismic Sheet Pile Wall.
- Existing Baffle Wall.

The buried Seismic Category II-SSE Fire Protection SSC identified in Table 3.2-1 are seismically analyzed using the design response spectra identified in Section 3.7.1.1.1 for use in the analysis of the Seismic Category I site-specific buried utilities. The analysis of the buried Seismic Category II-SSE fire protection SSC shall confirm they remain functional during and following an SSE in accordance with NRC Regulatory Guide 1.189 (NRC, 2007).
Section 3.7.3.12 further defines the methodology for the analysis of buried Fire Protection piping. Seismic Category II-SSE buried piping is an embedded commodity that by its nature does not significantly interact with aboveground Seismic Category I SSC.

The aboveground Seismic Category II and Seismic Category II-SSE Fire Protection SSC, including Fire Water Storage Tanks and Fire Protection Building identified in Table 3.2-1 are seismically analyzed utilizing the appropriate design response spectra. Seismic load combinations are developed in accordance with the requirements of ASCE 43-05 (ASCE, 2005) using a limiting acceptance condition for the structure characterized as essentially elastic behavior with no damage (i.e., Limit State D) as specified in the Standard. The analysis of the aboveground Seismic Category II-SSE fire protection SSC shall confirm they remain functional during and following an SSE in accordance with NRC Regulatory Guide 1.189 (NRC, 2007).

The Conventional Seismic Switchgear Building, which is located adjacent to the conventional seismic Turbine Building, is analyzed using the same methodology as that employed for the Turbine Building in the U.S. EPR FSAR Section 3.7.2.8.

The Conventional Seismic Grid Systems Control Building is located in the Switchyard area. As such, it is not located in the proximity of any Seismic Category I structures and, therefore, cannot interact with Seismic Category I structures.

The Seismic Category II Forebay structure is located adjacent to the south end of Seismic Category I buried Intake Pipes and the north side of Seismic Category I UHS Makeup Water Intake Structure. The Forebay structure is designed to the same requirements as the Seismic Category I UHS Makeup Water Intake Structure. The potential impact on Seismic Category I Intake Pipes and UHS Makeup Water Intake Structure will be evaluated during detailed design phase upon completion of final geotechnical investigation.

The Conventional Seismic Circulating Water Makeup Intake Structure is located adjacent to the two Seismic Category I Buried Intake Pipes. The Circulating Water Makeup Intake Structure is analyzed and designed using the same methodology as that employed for the Turbine Building in the U.S. EPR FSAR Section 3.7.2.8.

The Conventional Seismic Unit 3 Sheet Pile Wall is located approximately 30 ft from the north end of the Seismic Category I Buried Intake Pipes. The existing Baffle Wall is located approximately 50 ft from the north end of the Seismic Category I Buried Intake Pipes. Due to geometric configuration of the Sheet Pile Wall and the Baffle Wall with respect to the Buried Intake Pipes, the interaction of the structures with the Buried Intake Pipes is not possible.